Thesis
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RELATIONSHIP BETWEEN DISCIPLINARY RECORD OF U. S. NAVAL ENLISTED PERSONNEL AND GENERAL CLASSIFICATION TEST, AGE OF ENLISTMENT, AND OTHER FACTORS

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TABLE OF CONTENTS

Page

ABSTRACT iv

INTRODUCTION AND PURPOSE 1-3

SELECTION OF DATA 4

RESULTS 5-23

SUMMARY OF RESULTS 24

CONCLUSIONS 27

LIST OF TABLES

Table Page

1. Means, Standard Deviations, and Standard errors of the mean of Total Navy Group and Disciplinary Group 5

2. Test Score Data on Total Navy Group Taken from Naval Personnel Study 12

3. Test Score Data on Total Navy Group used in this Thesis 12

4. Means, Standard Deviations, and Standard errors of the mean of disciplinary and non-disciplinary sub-groups of Total Navy Group 13

5. Product-Moment Correlations between GCT, DI, Years of School, Age of Entry, Years of Service, Arithmetic Test and Clerical Test 14

6. Analysis of Years of School as an acceptance Criterion 25

7. Analysis of GCT as an Acceptance Criterion 26

LIST OF FIGURES

Figure		Page
1.	Comparison of Total Navy Group and Disciplinary Group in Basic Test Scores	8
2.	Comparison of Total Navy Group and Disciplinary Group in Age of Entry and Years of School	9
3.	Mean DI versus Years School for the combined Total Navy and Disciplinary Groups	10
4.	Mean DI for groups with various Years of Service	16
5.	Mean number of Captain's Masts for groups with various Years of Service	17
6.	Mean DI received by men of Total Navy Group during each Year of their Service	19
7.	Mean number of Captain's Masts received by men of the Total Navy Group during each Year of their Service	20
8.	Total number of Captain's Masts, Deck Courts, Summary Courts, and General Courts received by men in their various Years of Service	22

ABSTRACT

The purpose of this thesis is to evaluate the relationship between DI and GCT, Age of Entry, and other factors with the hope that certain of these relationships might be useful in the selection of Naval Personnel.

The General observations are that:

1. There is a significant difference between disciplinary and non-disciplinary naval groups in the following factors: 1. General Classification Test score, 2. Years of School, 3. Years of Service, and 4. Arithmetic Reasoning Test score.

2. There is a significant difference in the Age of Entry between the Total Navy Group and the Disciplinary group which was recommended for discharge.

3. The best criterion to use in the selection of Naval Personnel in order to reduce disciplinary cases appears to be the criterion of Years of School.

4. Those who have had only nine years of school appear to be the worst offenders against naval discipline.

5. The third year of a man's service seems to be the worst year in a disciplinary sense.

6. There is a significant correlation between the Disciplinary Index and the following factors: 1. Years of School, and 2. Years of Service.

7. There is a significant correlation between Years of School and the General Classification Test score.

RELATIONSHIP BETWEEN DISCIPLINARY RECORD OF U. S. NAVAL ENLISTED PERSONNEL AND GENERAL CLASSIFICATION TEST, AGE OF ENLISTMENT, AND OTHER FACTORS

INTRODUCTION AND PURPOSE

This thesis has to do with the disciplinary record of U. S. Naval Enlisted Personnel. There has been much discussion of late concerning Universal Military Training, minimum age of draftees, and the standards which the services require of those they accept for military training. One quality which is most important in a serviceman is his ability to get along with the established authority and to keep out of trouble. Everything else being equal, a man who has a "clean" service record makes a much more desirable serviceman than one who is continually getting into trouble.

The Naval Establishment gives each inductee the following four tests: (1) General Classification Test, (2) Arithmetic Test, (3) Clerical Test, and (4) Mechanical Test. The General Classification Test is the one used primarily for the placement of personnel. This test is a measure of intelligence and capacity for learning. There are one-hundred questions in this test. An example of a typical question is:

Rabbit is to trap as fish is to:

(a) Fin (b) Tail (c) Net (d) Swim (e) Breathe

The theoretical mean of this test is 50 and the theoretical standard deviation is 10.

A brief description of the disciplinary structure in the Naval Service is necessary to understand the procedure of this analysis. A man who commits an offense against the regulations and orders of the Naval Service is placed on a report list. The man then appears before the Commanding Officer of the ship or station and the man is confronted with the charge. The Commanding Officer can take one of several courses of action. He can dismiss the charge, he can assign limited punishments himself, he can assign the man a Deck Court Martial, a Summary Court Martial, or a General Court Martial, depending upon the severity of the offense. The punishments allowable under each of these situations are increased from Captain's Mast to Deck Court, to Summary Court and to General Court Martial.

For the purpose of this investigation a disciplinary index was devised to assign some order to the measurement of a man's disciplinary record. This Disciplinary Index is computed by assigning a value of one for each Captain's Mast at which a punishment is given, a value of two for each Deck Court, a value of three for each Summary Court, and a value of four for each General Court Martial. One point value of Disciplinary Index is equal to a step in the disciplinary ladder. A Disciplinary Index of two does not mean that the offense associated with this index is twice as severe as the offense associated with an index of one, nor does it mean that the punishment which can be given for an offense associated with an index of two is twice the punishment which can

be given for an offense associated with an index of one. The Disciplinary Index for any particular offense merely means that the offense reached a particular step in the disciplinary ladder.

The total number of points acquired by a man using the aforementioned values is the Disciplinary Index of the man. Henceforth, the Disciplinary Index will be abbreviated to DI.

The purpose of this thesis is to evaluate the relationship between DI and GCT, Age of Entry, and other factors. It is hoped that certain relationships can be evolved which will be useful in the selection of Naval Personnel.

SELECTION OF THE DATA

It was decided to obtain data on two groups of Naval personnel. One group was to be representative of the Navy as a whole and the other group was to consist of disciplinary cases only. 275 records of persons representative of the Navy as a whole were obtained from the files of the Bureau of Naval Personnel. The filing cabinets were of the four drawer type. Five or ten records were pulled from the second drawer of each cabinet until the total of 275 was obtained.

The second group consisted of only those who had disciplinary records. This group consisted of 50 men who had been recommended for undesirable discharges because of their disciplinary record, but who were retained in the Service. In other words, this group of 50 men were the best of a larger group which had been recommended for undesirable discharges. These 50 men were recommended for undesirable discharges during the two month period of August and September 1950.

RESULTS

The results of the analysis of the Total Navy Group of 275 cases and the Disciplinary Group of 50 cases is shown in Table 1.

Table 1

Means, Standard Deviations, and Standard errors of the mean of Total Navy Group and Disciplinary Group.

	GCT	YEARS SCHOOL	AGE ENTRY	YEARS SER.	ARI	CLER
Mean Group A ($\bar{X}_1$)	52.3	10.67	19.24	3.70	51.53	51.56
Mean Group B ($\bar{X}_2$)	47.2	9.62	18.06	4.24	46.56	48.48
Difference of the Means ($\bar{X}_1-\bar{X}_2$)	5.1	1.05	1.18	1.54	4.97	2.98
Standard Deviation: Group A ($\sigma\bar{x}_1$)	9.97	1.66	2.23	3.91	9.63	8.61
Standard Deviation: Group B ($\sigma\bar{x}_2$)	10.95	1.59	1.52	2.11	10.34	8.99
Standard error of the Mean ($\sigma\bar{x}_1-\bar{x}_2$)	1.56	.26	.33	.57	1.52	1.33
Standard errors $\frac{(\bar{X}_1-\bar{X}_2)}{(\sigma\bar{x}_1-\bar{x}_2)}$	3.3	4.1	3.59	2.7	3.27	2.24

Group A - Total Navy Group
Group B - Disciplinary Group

There is a significant difference (at the .001 level) in the means of the Total Navy Group and the Disciplinary Group in the factors GCT, Years of School, Age of Entry, and the Arithmetic Test score (ARI). There are 4.1 standard errors between the mean Years of School of the Total Navy Group and the mean of the Years of School of the Disciplinary Group. This means that there are about 52

chances in one million of obtaining a difference in the means of plus or minus 1.05 by chance alone. This is highly significant. There is a certain amount of discipline to school work. A high school student must be in school at a certain time of the day and he must remain the school for a certain period each day. He is subject to the instructions and assignments of his teachers. He must do a certain amount of outside work which requires some degree of self-discipline and motivation. It is possible that the same factors which might lead a high school student to drop out of school might also lead to his poor disciplinary record in the Navy. In a study by the Bureau of Naval Personnel[1] of those not recommended for reenlistment, it was noted that:

> Education differentiates between the two groups (Total Navy Group and "Not recommended for reenlistment" Group) more adequately than do the Basic Test Battery scores. The predictive value of education is greater, probably because t "not recommended for reenlistment" are similar to the non-intellectual factors associated with the lack of school success. For example, such factors as motivation, emotional stability, interest, and home environment would greatly effect performance in school and in the Navy.

A person who does not have enough self-discipline, motivation, or perseverance to finish high school is more likely to lack the self-discipline, motivation, or perseverance to perform satisfactorily in the Navy.

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[1] Research Division of Bureau of Naval Personnel., *Report on Study of Characteristics of Enlisted Personnel Not Recommended for Reenlistment*; BuPers, February 1, 1950.

The Age of Entry into the Service is also significant (at the .003 level) in the difference between the mean of the Total Navy Group and the mean of the Disciplinary Group. This ties in reasonably well with the Years of School factor. A person who leaves school prematurely may enlist in the Navy at a younger age than one who completes his high school course. GCT scores also tie in with the Years of School factor and the Age of Entry factor. It is also logical to assume that those who leave school early have less intelligence than those who finish high school. Figures 1 and 2 show graphically the means of the test scores, Age of Entry, and Years of School of the Total Navy Group and the Disciplinary Group.

Figure 3 shows the mean DI against Years of School for the two groups taken together (N equal to 315). It is interesting to note in connection with Figure 3 that the mean DI of those with 6 years of school is .75. The mean DI then increases with Years of School, reaching a maximum of 3.64 for those with 9 years of school. The DI then decreases to .60 for those with 12 years of school. A possible explanation for this situation might be that those who left school before finishing elementary school were forced to do so by their parents or by financial or other considerations at home. They might have had that trait which, for want of a better term, we shall call perseverance, but the decision as to whether they should continue in school was not their own. The ones who had the least of this quality of perseverence were those who, upon being confronted with the

Fig. 1

Comparison of Total Navy Group and Disciplinary Group In Basic Test Scores.

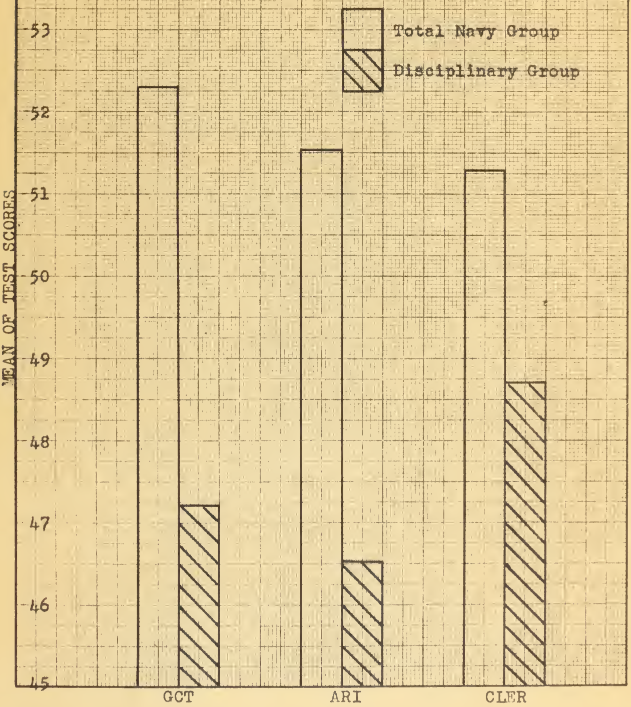
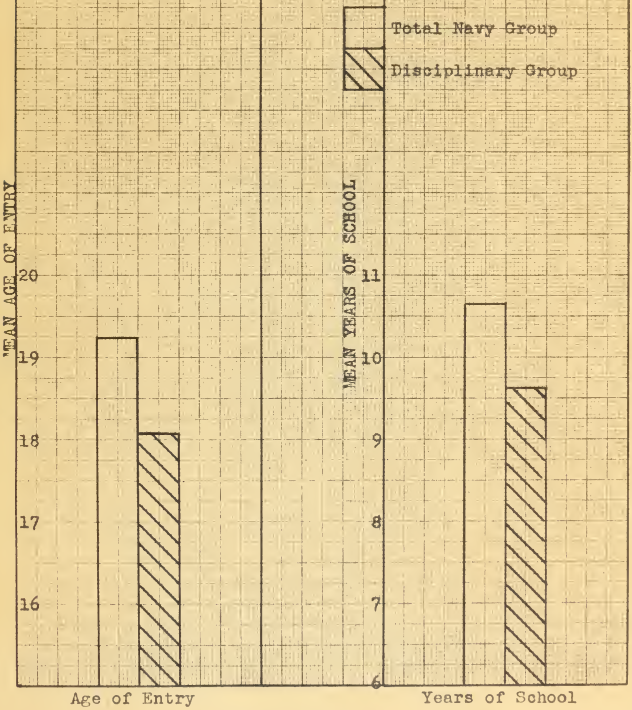


Fig. 2

Comparison of Total Navy Group and Disciplinary Group in Mean Age of Entry and Mean Years of School



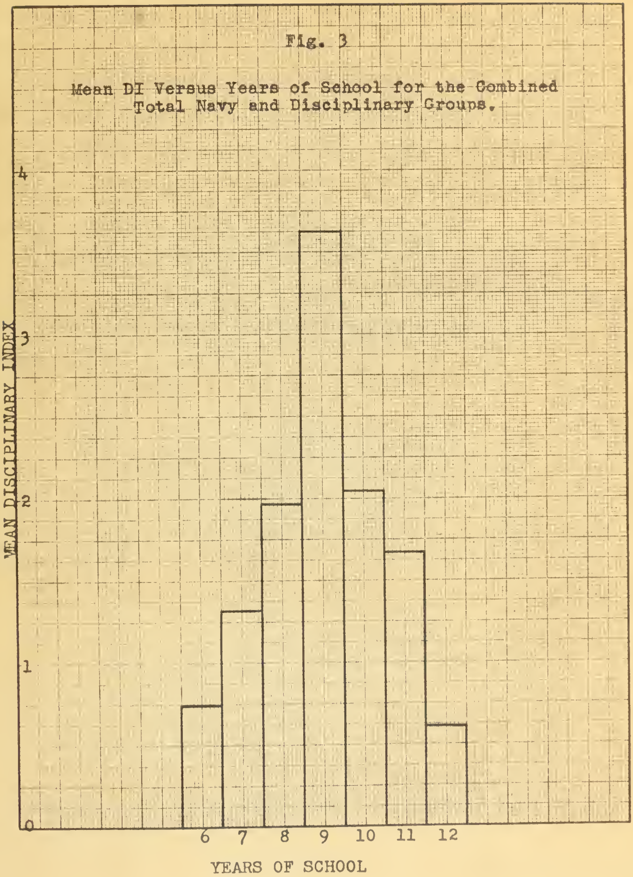


Fig. 3

Mean DI Versus Years of School for the Combined Total Navy and Disciplinary Groups.

new situation in the secondary school, gave up after one year. Those who had the next lowest value of perseverance were those who gave up after two years of secondary school. Those who had the most perseverance were those who finished secondary school and who went on to their thirteenth year of school. As Figure 3 shows, the men who finished 9 years of school were those with the highest mean DI. There appears to be ~~much~~ room for further investigation as to why the 9th grade students make the poorest showing in the Navy.

Table 2[2] shows data for a total navy group which entered the service during the period September 1945 through June 1946. The number of cases involved in this group is unknown.

[2] Ibid. Para. 1

Table 2

Test Score Data On Total Navy Group (Period of Enlistment September 1945-June 1946) Taken from Naval Personnel Study. (N is unknown)

	GCT	ARI	CLER
Mean	50.3	49.8	51.3
Standard Deviation	11.6	12.0	8.1

Table 3

Test Score Data on Total Navy Group Used in this Thesis (N is equal to 275)

	GCT	ARI	CLER
Mean	52.31	51.53	51.56
Standard Deviation	9.96	9.63	8.61

An analysis of the Total Navy Group used in this investigation shows that the true mean GCT of the Total Navy should lie between 50.77 and 53.85 at 99% confidence limits. The Total Navy Group used in the Bureau of Naval Personnel Study falls outside the 99% confidence limits. It is interesting to note at this point that the theoretical means of the test scores in the Navy is 50.0 and the theoretical standard deviations of the test scores in the Navy is 10.0. While the means of the test scores used by the Bureau of Naval Personnel more nearly approach the theoretical true mean of the Navy, the standard deviations of the test scores used in this thesis more nearly approach the theoretical true standard deviations of the Navy.

The Total Navy Group used in this thesis was divided into two sub-groups with one sub-group containing those whose DI was equal to zero, and the other sub-group containing those whose DI was greater than zero. The following two groups were obtained:

Group A1 - DI equal to zero - N equal to 200

Group A2 - DI greater than zero - N equal to 75

Table 4 shows that the Years of Service factor, Years of School factor and GCT factor are significant (at the .003 level) when the means of the two groups are compared.

Table 4

Means, Standard Deviations, and Standard errors of the mean of disciplinary and non-disciplinary sub-groups of the Total Navy Group.

	GCT	YEARS SCHOOL	AGE ENTRY	YEARS SER.	ARI	CLER
Mean Group A1 ($\bar{X}_1$)	53.45	11.1	19.30	2.88	52.92	52.17
Mean Group A2 ($\bar{X}_2$)	49.08	9.8	19.08	5.93	49.95	49.92
Diff. of the Means ($\bar{X}_1-\bar{X}_2$)	4.37	1.3	.22	3.05	2.97	2.25
Standard Dev. Group A1 ($\sigma_{\bar{x}_1}$)	9.67	1.58	2.02	3.39	7.7	9.04
Standard Dev. Group A2 ($\sigma_{\bar{x}_2}$)	10.13	1.61	2.69	4.34	9.6	9.12
Standard error of the mean ($\sigma_{\bar{x}_1-\bar{x}_2}$)	1.33	.22	.96	.5	1.12	1.20
Number of Stand. errors of mean $\frac{(\bar{X}_1-\bar{X}_2)}{(\sigma_{\bar{x}_1-\bar{x}_2})}$	3.28	6.02	.23	8.7	2.65	1.97

The Years of Service factor overshadows all the other factors. This might be expected since the longer a person is in the Naval Service, the more time he has to commit offenses, and the more time he has to accumulate a Disciplinary Index. Table 4 shows that the GCT test differentiates more between those with disciplinary records and those with "clean" records than do the Arithmetic Reasoning Test (ARI) and the Clerical Test (CLER).

Table 5 shows the product-moment correlations between DI and various factors. Only three of the correlations shown in Table 5 are significant (at the .003 level). Years of School and DI show a negative significant relationship. Years of School and GCT show a positive significant relationship, and Years of Service and DI show a positive significant relationship.

Table 5

Product-Moment Correlations Between GCT, DI, Years of School, Age of Entry, Years of Service, Arithmetic Test and Clerical Test. (Correlations enclosed in parenthesis indicate significance at the .003 level)

	DI	GCT	Years School	Age Entry	Years Service
DI	XXXXXX	-.093	(-.225)	-.016	(.317)
GCT	-.093	XXXXXX	(.544)	-.095	-.049
Years of School	(-.225)	(.544)	XXXXXXX	-.120	-.073
Age of Entry	.016	-.095	-.120	XXXXXX	.115
Years of Service	.317	-.049	-.073	.115	XXXXXX
ARI	-.149	XXXXXX	XXXXXXX	XXXXXX	XXXXXX
CLER	-.098	XXXXXX	XXXXXXX	XXXXXX	XXXXXX

The method of partial correlation[3] was used in comparing DI with GCT and holding Years of Service constant. The correlation between DI and GCT was reduced slightly from -.093 to -.08, and the relationship still remained insignificant.

Figure 4 shows the mean DI of the Total Navy Group for those with various years of service. The mean DI increases from the first year of service to the fourth year of service. The DI then drops with the fifth year of service group and again builds up to a maximum with the eighth year of service group. Once again the mean DI drops with the ninth year of service group and builds up to another peak with the twelfth year of service group. This cyclic rise and fall every four years is even more apparent in Figure 5 which shows the mean number of Captain's Masts of the Total Navy Group for those with various years of service. These two figures show that the mean DI and Mean number of Captain's Masts increase with each year of service. The drop at the end of each four year period probably results from the discharge from the service of those with the highest DI in the previous year. In other words, from the time a group enters the Naval Service, their mean DI increases. At the end of four years, those who have the highest DI accept their discharge because those with the

[3] Croxton, F. E. and Crowden, D. J., Applied General Statistics; New York, Prentice-Hall, Inc., 1937, Chap. 24.

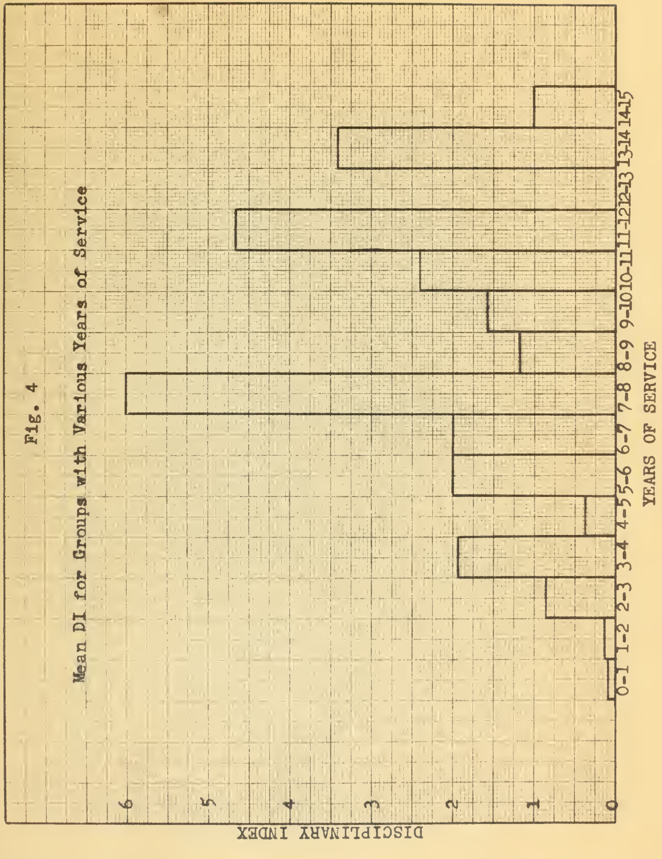


Fig. 4

Mean DI for Groups with Various Years of Service

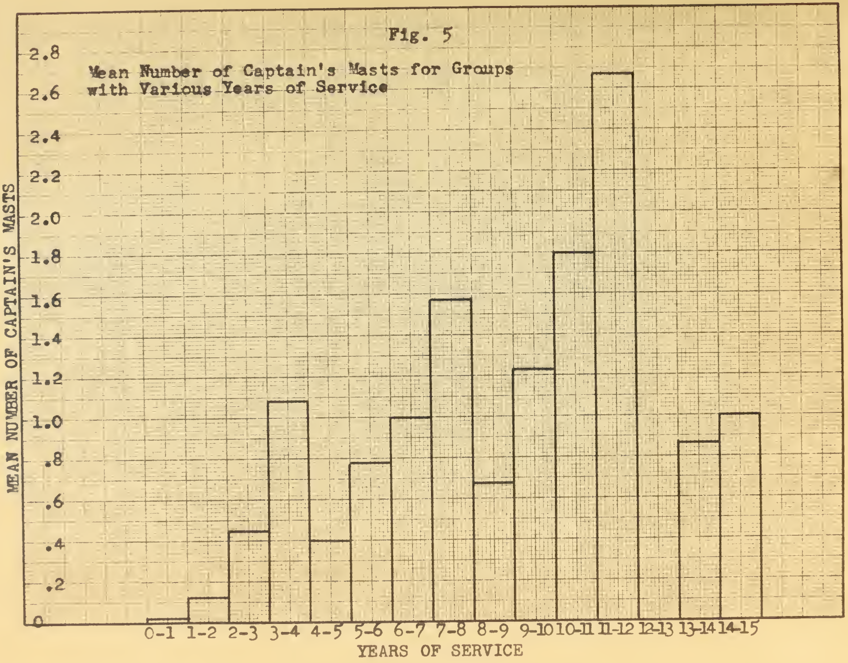


Fig. 5

Mean Number of Captain's Masts for Groups with Various Years of Service

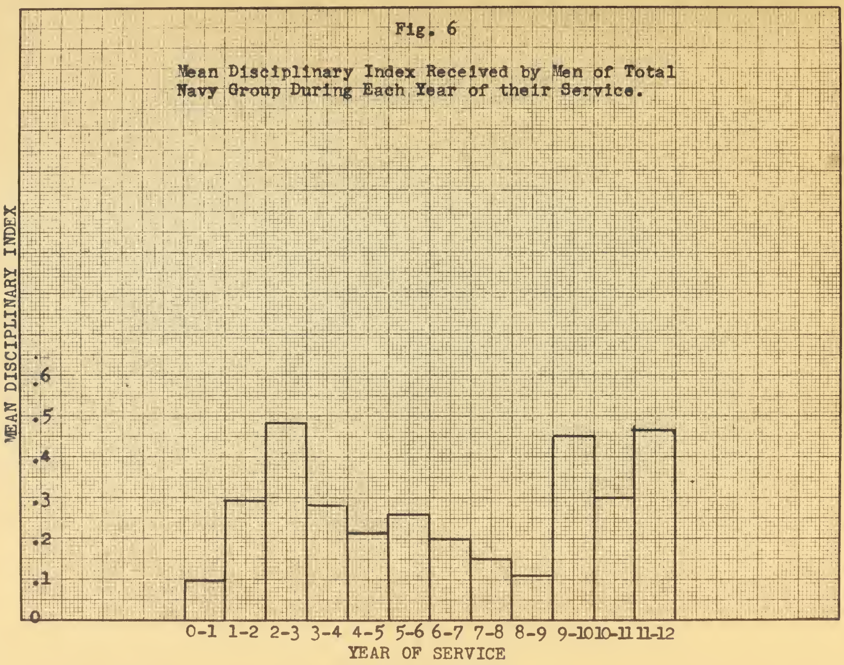
highest DI have the lowest regard for naval life. The discharge of those with the highest DI reduces the mean DI of those left in the same group. However, the mean DI of this group again builds up to a maximum four years hence, and again this weeding out process takes place to reduce the mean DI. In Figure 5, the low of each four year cycle is successively greater than the low of the preceding cycle, and the high of each four year cycle is successively greater than the high of the preceding cycle. The same statement can be made about Figure 4 with the one exception that the high of the eighth year of service group is higher than the high of the twelfth year of service group.

Figure 6 shows the mean DI for each year of a man's service. In the first year of each man's service, a mean DI of .098 was accumulated. In the second year of a man's service a mean DI of .29 was accumulated. In the third year of a man's service a mean DI of .477 was accumulated. From this figure, it would seem that the third year of service produced the highest DI. From the third year on to the ninth year, the mean DI in general tapers off. Figure 6 indicates a large jump in the DI during the 9th year. However, the number of cases involved during the last few years of service is relatively small and the results in this region are not reliable. Figure 7 shows the mean number of Captain's Masts for each year of a man's service. This Figure very closely approximates Figure 6. This in-highest IC have the lowest amount for cond 1110. The discharge of those with the highest IC reduces the mean IC of those left in the same group. However, the mean IC of this group again builds up to a maximum four years later, and again this weeding out process takes place at about the same IC. In Figure 5, the low of each four year cycle is noticeably greater than the low of the preceding cycle, and the high of each four year cycle is considerably greater than the high of the preceding cycle. The same statement can be made about Figure 4 with the one exception that the high of the eighth year of service group is higher than the high of the twelfth year of service group.

Figure 6 shows the mean IC for each year of a man's service. In the first year of each man's service, a mean IC of .098 was accumulated. In the second year of a man's service a mean IC of .09 was accumulated. In the eighth year of a man's service a mean IC of .077 was accumulated. From this figure, it would seem that the first year of service produced the highest IC. From the third year on to the ninth year, the mean IC is [illegible]. Figure 6 indicates a large jump in the IC during the 9th year. However, the number of cases involved during the last few years of service is relatively small and the results in this region are not reliable. Figure 7 shows the mean number of Garfield's tests for each year of a man's service. This figure very closely corresponds Figure 6. This in-

Fig. 6

Mean Disciplinary Index Received by Men of Total Navy Group During Each Year of their Service.



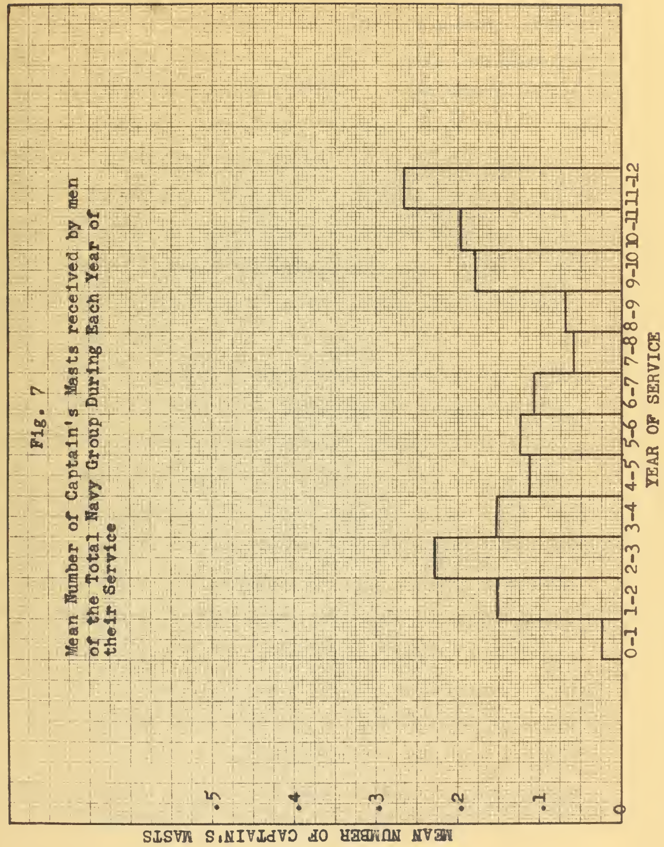


Fig. 7

Mean Number of Captain's Masts received by men of the Total Navy Group During Each Year of their Service

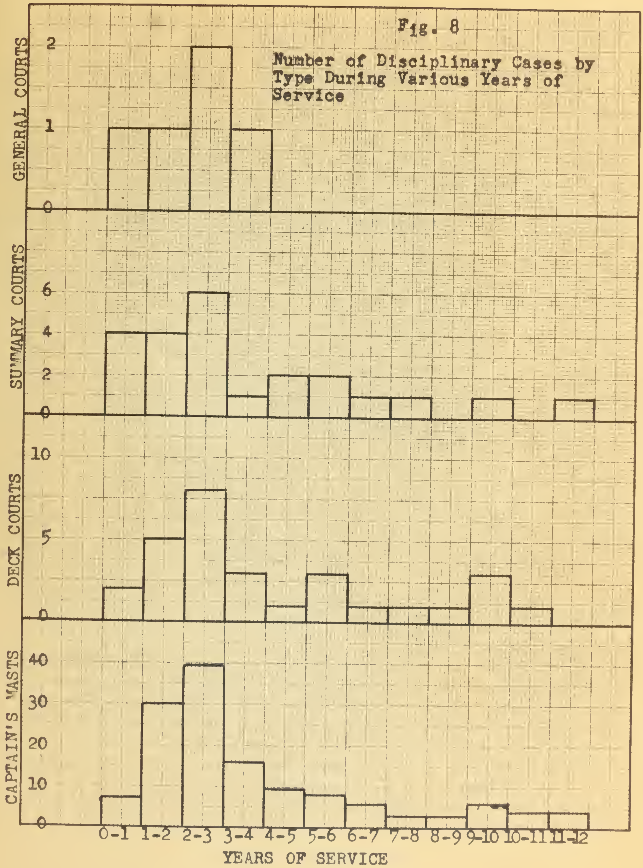
dicates that merely by examining the number of Captain's Masts accumulated by a man in the Naval Service will give a reasonable clue to the man's disciplinary record. Figure 8 shows for each type of disciplinary action, the total number of occurrences of such disciplinary action during particular years of service. For example, of all the Captain's Masts received by the Total Navy Group, 39 Captain's Masts were received during the third year of service. Once again it seems as though the third year of service is a critical one as far as disciplinary action is concerned. More of each type of disciplinary action occur during the third year than in any other.

In the Total Navy Group, there are represented 258 Caucasians, 11 Negroes, and 6 Malayans. Twenty-four percent of the Caucasians, eighty-two percent of the Negroes, and sixty-seven percent of the Malayans had a DI greater than zero. The mean GCT of the Negroes in the Total Navy group is 41, and the mean GCT of the Malayans is 34. These mean GCT scores are far below the mean GCT (52.3) of the Total Navy group in which they are also included. The percentage of Negroes in the Total Navy Group of this thesis is 4 percent which is the same as the percentage of Negroes in the Total Navy Group used in a study of enlisted personnel[4] by the Bureau of Naval Personnel. The data for this latter group was given previously in Table 2. The number

[4] Research Division of Bureau of Naval Personnel, Op. Cit., Para. 7

Fig. 8

Number of Disciplinary Cases by Type During Various Years of Service



of Malayans in the Bureau of Naval Personnel study is not known.

In the Total Navy Group, there are 55 who are married and 719 who are single. Forty-six percent of the married men have a DI greater than zero. Twenty-two percent of the single men have a DI greater than zero. The mean years of service for the married men is 8.34. The mean years of service for the Total Navy Group is 3.70.

SUMMARY OF RESULTS

In the analysis of the means of the Total Navy Group and the Disciplinary Group, the difference of the means is significant at the .003 level in the following factors: 1. GCT, 2. Years of School, 3. Age of Entry, and 4. Arithmetic Test Score. In these same two groups, the difference of the means in the Years of Service factor is significant at the .01 level.

In the analysis of the means of the disciplinary and non-disciplinary sub-groups of the Total Navy Group, the difference of the means is significant at the .003 level in the following factors: 1. GCT, 2. Years of School, and 3. Years of Service. In these same two sub-groups, the difference of the means in the Arithmetic Test Score is significant at the .01 level.

The product-moment correlation between DI and Years of School (-.225) is significant at the .003 level. The correlation between DI and Years of Service (.317) is significant at the .003 level. The correlation between GCT and Years of School (.544) is significant at the .003 level.

The correlation between DI and GCT (-.093) and the correlation between DI and Age of Entry (-.016) are both insignificant. If it were possible to limit the acceptance of applicants for the Naval Service using Years of School as the criterion, it would be possible to greatly reduce the percentage of disciplinary cases in the Naval Service.

Table 6

Analysis of Years of School as Acceptance Criterion

	Years School Required					
	7	8	9	10	11	12
Number of Total Navy Group who would be accepted	272	264	235	209	167	131
Number of Disciplinary Cases in Total Navy Group Accepted	74	69	57	43	27	16
Percentage of Disciplinary Cases Accepted	27.2	26.1	24.3	20.6	16.2	12.2
Percent Reduction in Discip. Cases of Total Navy Group	.1	1.2	3.0	6.7	11.1	15.1
Percent Reduction of those recommended for Discharge Gr.	4.0	6.0	24.0	44.0	74.0	84.0
Selection Ratio[5]	.98	.96	.85	.76	.61	.48

Table 6, an Analysis of Years of School as an Acceptance Criterion, shows that if only those with at least ten years of school were accepted, the percentage of disciplinary cases in the Total Navy Group would be 20.6 and 44% of the group of fifty which had been recommended for undesirable discharge would have been eliminated. If only those who had at least twelve years of school were accepted, then we might expect to have only 15.1% disciplinary cases in a total navy group and 84% of those recommended for undesirable discharges would be eliminated.

If it were possible to limit the acceptance of applicants for the Naval Service using the General Classification Test score as a criterion, it would also be possible to reduce the percentage of disciplinary cases in the Naval Service.

[5] Tiffin, J., Industrial Psychology; New York, Prentice-Hall, Inc., 1947, pp. 66.

Table 7

Analysis of GCT as Acceptance Criterion

	minimum GCT requirements					
	37	40	43	46	49	52
Number of Total Navy Group who would be accepted	253	248	233	210	176	142
Number of Disciplinary Cases in Total Navy Group Accepted	64	63	58	53	42	34
Percentage of Disciplinary Cases accepted	25.3	25.4	24.9	25.2	23.9	24.0
Percent Reduction in Discip. Cases of Total Navy Group	2.0	1.9	2.4	2.1	3.4	3.3
Percent Reduction of those recommended for Discharge Gr.	.18	.28	.38	.46	.50	.60
Selection Ratio	.92	.90	.85	.76	.64	.52

Table 7, an Analysis of GCT as an acceptance criterion, shows that if acceptance in the Naval Service were limited to a GCT score of 52 or greater, the percentage of disciplinary cases in the Total Navy group would be 24 instead of the present 27.3%. In addition, 60% of those in the recommended for discharge group would be eliminated. Obviously, there is little value to the use of GCT as a criterion. In order to obtain the benefits which result from a GCT score of 52 or greater, it would be necessary to select only 52% of the applicants. This would not be feasible for the dubious benefits received.

CONCLUSIONS

Based on the foregoing results, the following conclusions are drawn:

1. There is a significant difference between disciplinary and non-disciplinary naval groups in the following factors: 1. General Classification Test score, 2. Years of School, 3. Years of Service, and 4. Arithmetic Reasoning Test score.

2. There is a significant difference in the Age of Entry between the Total Navy Group and the Disciplinary group which was recommended for discharge.

3. The best criterion to use in the selection of Naval Personnel in order to reduce disciplinary cases appears to be the criterion of Years of School.

4. Those who have had only nine years of school appear to be the worst offenders against naval discipline.

5. The third year of a man's service seems to be the worst year in a disciplinary sense.

6. There is a significant correlation between the Disciplinary Index and the following factors: 1. Years of School, and 2. Years of Service.

7. There is a significant correlation between Years of School and the General Classification Test score.

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